Vamorr 48 and 50

Two New Flue-Cured Tobacco Varieties Resist Mosaic and Rootrot

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Figure 1.—A plant of No. 402 tobacco infected with mosaic. Note the crinkled and deformed leaves. On the farm where this plant was grown the grower has had trouble with mosaic for the past 15 years and has been unable to control it by sanitary measures.

VAMORR 48 AND 50; TWO NEW FLUE-CURED VARIETIES OF TOBACCO RESISTANT TO MOSAIC AND ROOTROT

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Tobacco diseases cause losses of millions of dollars annually to the tobacco crop in the United States, and scientists have long been trying to find satisfactory measures for their control. In recent years, special emphasis has been given to developing disease-resistant varieties. The results of this work have been

Figure 2.—Mosaic on a plant of Virginia Gold tobacco. The leaves are light and mottled and also distorted and puckered. The grower on whose farm this plant was grown estimates that the value of his crop was reduced as much as $150 per acre by mosaic.

most encouraging and disease-resistant varieties of tobacco are now being grown by farmers wherever the crop is grown. In general, however, these varieties are resistant to only one disease; that is, a variety resistant to Granville wilt is only resistant to Granville wilt. Thus, if two important diseases happen to occur in the same field, only one can be controlled by the use of the present varieties. To remedy this situation, plant breeders are now endeavoring to incorporate resistance to several diseases in a single variety; that is, to develop varieties with multiple disease resistance. Considerable progress has already been made in this work and it can be safely predicted that varieties will soon be available which carry resistance to a number of important diseases. It is the purpose of this bulletin to report the successful development of two good yielding varieties of flue-cured tobacco with resistance to both mosaic and black rootrot.

Mosaic

The mosaic disease of tobacco is recognized by a rough crinkled growth of the newly formed leaves, together with a bleaching

Figure 3.—Left, A row of Virginia Gold tobacco in which every plant has developed mosaic. Right, The mosaic disease has been prevented here by growing the resistant variety Vamorr 50.

out of the green color in between the crinkles, which gives the leaves a mottled or "mosaic" appearance (Figures 1 and 2). Diseased plants are undersized and the cured leaves are usually of poor quality; thus, the income from plants affected with mosaic is considerably lower than that from healthy plants. The loss caused by the mosaic disease ranges from 30 to 50 percent for early infected plants down to 0 to 10 percent for late infected ones. In dry, hot seasons the losses are especially

Figure 4.—A plant of the Vamorr 50 variety. Note the freedom of mosaic. This plant was grown in the same field with the Virginia Gold variety illustrated in Figure 2.

high because sun scalding makes many leaves on diseased plants worthless.

The mosaic virus can be carried in smoking and chewing tobacco, tobacco refuse from the pack-house, old stalks, certain perennial weed hosts and to a limited extent in the soil. Carefully applied sanitary measures to prevent contaminating the young plants with the virus have usually controlled or greatly reduced the amount of mosaic infection in the subsequent crop but on certain farms such measures have proven unsuccessful. It is on such farms that mosaic-resistant varieties will be of greatest value.

Rootrot

Rootrot as it occurs on flue-cured tobacco in Virginia was formerly attributed to a fungus (*Thielaviopsis basicola*) but in recent years it has been learned that common rootrot may be caused by several different soil-borne organisms. These organisms usually occur together with the predominant one varying with different environmental conditions. Certain nematodes of the meadow nematode group are destructive on many soils, while on other soils fungi seem to cause the greatest injury. These root pathogens attack mainly the fibrous roots and their activity is favored by low soil temperatures. Thus, the injury from rootrot is manifested by a stunted growth which is especially noticeable in the spring and early summer. The infected roots vary in color from black to light brown. Under severe conditions all of the roots may be involved but under less favorable conditions only the lower ones appear rotted.

The rootrot pathogens occur on the roots of a large number of crops in addition to tobacco. The disease is therefore difficult to control by crop rotation. For this reason resistant varieties of tobacco are especially valuable in the control of rootrot. The resistant varieties, Yellow Special, Nos. 400, and 402, have been widely used but they are now known to be only tolerant or partially resistant to rootrot. Under some conditions they perform satisfactorily but under conditions more favorable for rootrot, their degree of resistance is not sufficient to give full protection. Research studies have, for this reason, been directed towards developing varieties that are more highly resistant to the disease. Extensive advancements have been made in this direction and improved varieties are now available.

Figure 5.—The Vamorr 48 variety is resistant to mosaic and rootrot and produces a high quality leaf. This plant was growing adjacent to the No. 402 plant shown in Figure 1.

Vamorr Varieties of Tobacco

The Vamorr varieties of tobacco were developed by crossing plants resistant to mosaic on plants which were resistant to rootrot and then outcrossing the progeny of this cross with plants of good-flue-cured varieties to obtain desirable leaf characteristics and curing qualities. From the progeny of these crosses plants were selected that possessed resistance to both mosaic and rootrot as well as excellent flue-cured tobacco characteristics. Seed was saved from these plants for further testing and selecting. After a period of years, strains were established which maintained their disease resistance and performed well in yield tests. Two of these strains were selected for trials on farms where mosaic had been difficult to control. The results were remarkable. Every plant of the resistant strains remained free of mosaic; whereas, 100 percent of the plants of susceptible varieties planted in adjacent rows developed mosaic. The farmers were able to cure the leaf from the disease-resistant varieties with ease, and the yield was satisfactory. In yield tests conducted in the absence of mosaic on experimental plots at Chatham, Virginia, the resistant strains gave returns approximately equal to those obtained from Yellow Special but somewhat less than those from the new variety Virginia Gold. (The Virginia Gold variety is rootrot resistant but completely susceptible to mosaic.) A limited quantity of seed of the two Vamorr strains has been saved and will be released under the variety names of Vamorr 48 and Vamorr 50. The name "Vamorr" was derived from the abbreviations for Virginia-mosaic-rootrot-resistance.

In field appearance, the Vamorr varieties are similar to Yellow Special. The leaves are broad, of medium length and relatively smooth. The tip leaves are noticeably broader and smoother than those of such varieties as Yellow Mammoth, but are shorter in length. The leaf spacing is slightly greater than that for Yellow Mammoth. Plants of Vamorr 48 grow slightly smaller and the upper leaves stand up straighter than those of Vamorr 50. The yield in pounds of leaf for Vamorr 50 has exceeded that for Vamorr 48, but this advantage in yield was partially offset by a better quality leaf from Vamorr 48. Both varieties flower 2 to 4 days later than Yellow Special.

Figure 6.——Rootrot infection is manifested by a stunted growth of the plants, an unusual wilting of the leaves during the day, and an abnormally dark-green color. Left, Vamorr 50, a resistant variety, growing on root-rot-infested soil. Right, Yellow Mammoth, a rootrot-susceptible variety, growing in an adjoining row. Note the stunted growth.

Figure 7.—Tobacco varieties can be evaluated for rootrot resistance in the greenhouse. In this photograph, the series of root systems illustrate the range of rootrot development on varieties with varying degrees of resistance. The root system on the extreme right is from a plant of a susceptible variety, such as Yellow Mammoth, and shows severe rootrot injury; whereas, the root system on the left is free from plants of more resistant varieties and shows only slight to moderate injury.

Summary

Two new varieties of flue-cured tobacco, Vamorr 48 and Vamorr 50, are described. The chief advantage of these new varieties over established varieties is their high level of resistance to rootrot and mosaic. They are similar in field appearance to Yellow Special and yield approximately as well as that variety in the absence of rootrot and mosaic and are superior to Yellow Special in the presence of these diseases. In farm trials, where 100 percent of the plants of susceptible varieties contracted mosaic, the Vamorr varieties remained completely free of the disease. It is strongly recommended that farmers who have experienced difficulty in controlling mosaic and rootrot try one of the Vamorr varieties.

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